

RF MOSFET Power Transistor, 20W, 28V

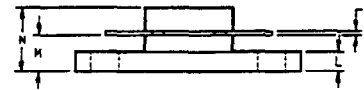
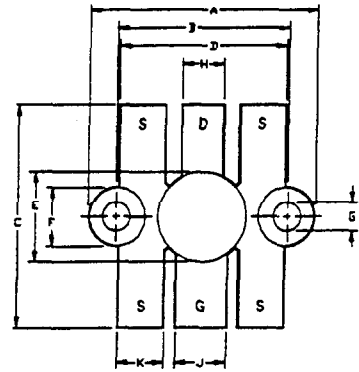
100 - 500 MHz

UF2820R

V2.00

Features

- N-Channel Enhancement Mode Device
- DMOS Structure
- Lower Capacitances for Broadband Operation
- High Saturated Output Power
- Lower Noise Figure Than Competitive Devices



Absolute Maximum Ratings at 25°C

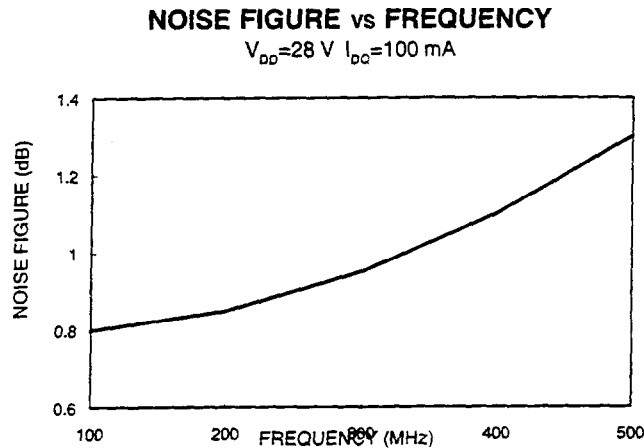
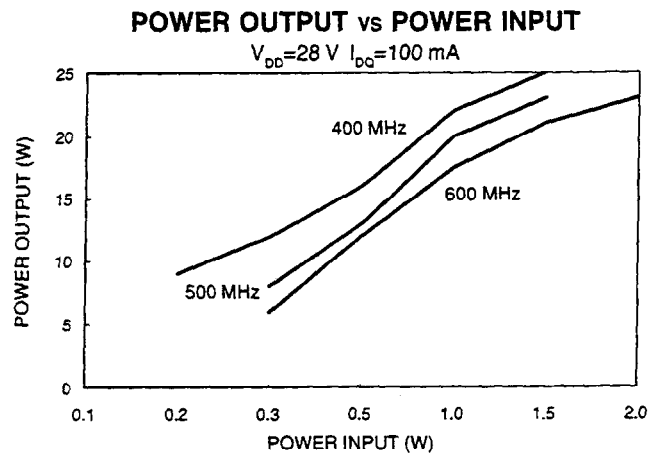
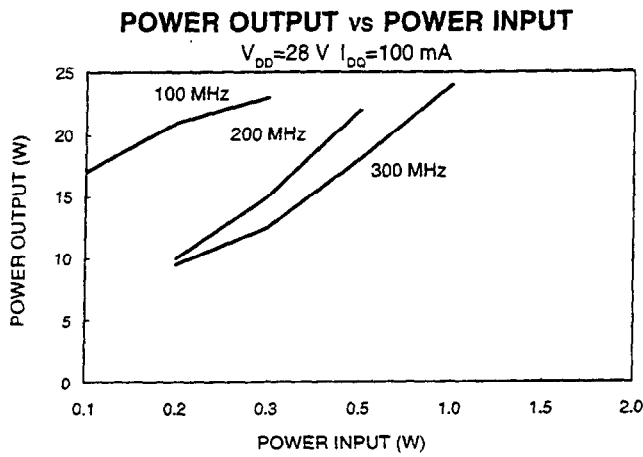
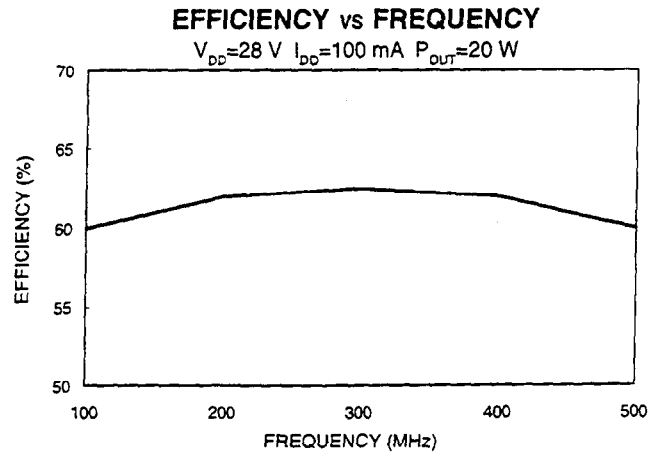
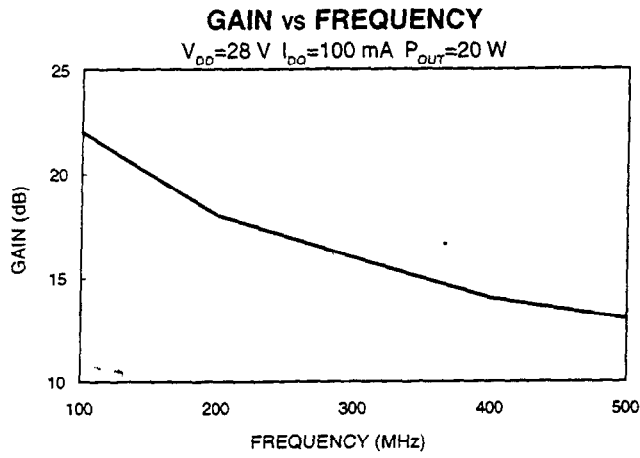
| Parameter | Symbol | Rating | Units |
|----------------------|---------------|-------------|-------|
| Drain-Source Voltage | V_{DS} | 65 | V |
| Gate-Source Voltage | V_{GS} | 20 | V |
| Drain-Source Current | I_{DS} | 4 | A |
| Power Dissipation | P_D | 61 | W |
| Junction Temperature | T_J | 200 | °C |
| Storage Temperature | T_{STG} | -55 to +150 | °C |
| Thermal Resistance | θ_{JC} | 2.86 | °C/W |

| LETTER | MILLIMETERS | | INCHES | |
|--------|-------------|-------|--------|------|
| | MIN | MAX | MIN | MAX |
| A | 24.64 | 24.87 | .970 | .980 |
| B | 18.29 | 18.54 | .720 | .730 |
| C | 23.86 | 24.38 | .940 | .960 |
| D | 18.16 | 18.42 | .715 | .725 |
| E | 9.47 | 9.73 | .373 | .383 |
| F | 6.22 | 6.48 | .245 | .255 |
| G | 2.92 | 3.18 | .115 | .125 |
| H | 4.45 | 4.69 | .175 | .185 |
| J | 5.46 | 5.72 | .215 | .225 |
| K | 4.95 | 5.21 | .195 | .205 |
| L | 2.41 | 2.67 | .095 | .105 |
| M | 4.86 | 4.57 | .160 | .180 |
| N | 6.38 | 7.39 | .253 | .291 |
| P | .30 | .15 | .004 | .006 |

Electrical Characteristics at 25°C

| Parameter | Symbol | Min | Max | Units | Test Conditions |
|--------------------------------|--------------|------|------|---------------|--|
| Drain-Source Breakdown Voltage | BV_{DSS} | 65 | - | V | $V_{GS}=0.0\text{ V}, I_{DS}=5.0\text{ mA}$ |
| Drain-Source Leakage Current | I_{DSS} | - | 1.0 | mA | $V_{DS}=28.0\text{ V}, V_{GS}=0.0\text{ V}$ |
| Gate-Source Leakage Current | I_{GSS} | - | 1.0 | μA | $V_{GS}=20\text{ V}, V_{DS}=0.0\text{ V}$ |
| Gate Threshold Voltage | $V_{GS(TH)}$ | 2.0 | 6.0 | V | $V_{DS}=10.0\text{ V}, I_{DS}=100.0\text{ mA}$ |
| Forward Transconductance | G_M | .500 | - | S | $V_{DS}=10.0\text{ V}, I_{DS}=1000.0\text{ mA}, \Delta V_{GS}=1.0\text{ V}, 80\text{ }\mu\text{s Pulse}$ |
| Input Capacitance | C_{ISS} | - | 45 | pF | $V_{DS}=28.0\text{ V}, F=1.0\text{ MHz}$ |
| Output Capacitance | C_{OSS} | - | 30 | pF | $V_{DS}=28.0\text{ V}, F=1.0\text{ MHz}$ |
| Reverse Capacitance | C_{RSS} | - | 8 | pF | $V_{DS}=28.0\text{ V}, F=1.0\text{ MHz}$ |
| Power Gain | G_P | 10 | - | dB | $V_{DD}=28.0\text{ V}, I_{DQ}=100.0\text{ mA}, P_{OUT}=20.0\text{ W}, F=500\text{ MHz}$ |
| Drain Efficiency | η_D | 50 | - | % | $V_{DD}=28.0\text{ V}, I_{DQ}=100.0\text{ mA}, P_{OUT}=20.0\text{ W}, F=500\text{ MHz}$ |
| Load Mismatch Tolerance | VSWR-T | - | 20:1 | - | $V_{DD}=28.0\text{ V}, I_{DQ}=100.0\text{ mA}, P_{OUT}=20.0\text{ W}, F=500\text{ MHz}$ |

Typical Broadband Performance Curves



Typical Device Impedance

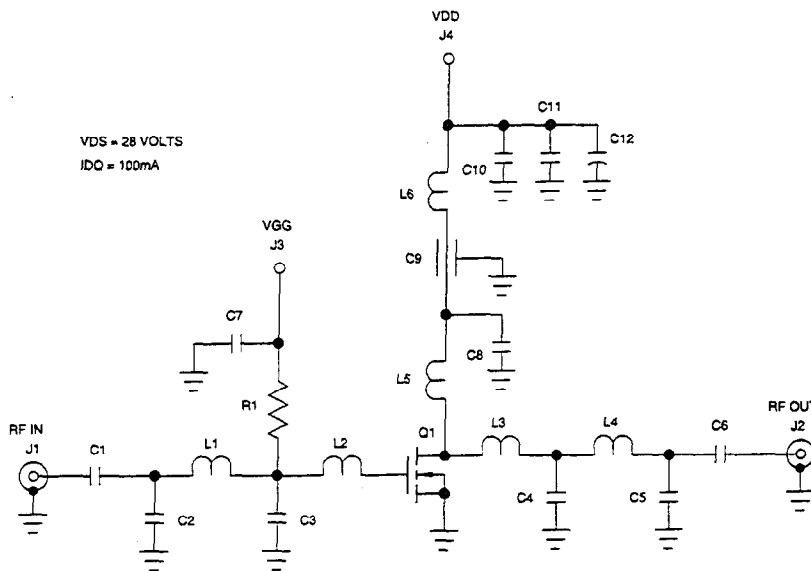
| Frequency (MHz) | Z _{IN} (OHMS) | Z _{LOAD} (OHMS) |
|-----------------|------------------------|--------------------------|
| 100 | 8.0 - j 16.0 | 12.0 + j 6.0 |
| 200 | 5.5 - j 8.0 | 9.3 + j 6.0 |
| 300 | 4.0 - j 3.8 | 6.8 + j 5.5 |
| 400 | 3.0 - j 2.0 | 4.5 + J 4.5 |
| 500 | 2.0 + J 1.0 | 3.0 + j 3.0 |

V_{DD}=28 V, I_{DQ}=100 mA, P_{OUT}=20.0 Watts

Z_{IN} is the series equivalent input impedance of the device from gate to source.

Z_{LOAD} is the optimum series equivalent load impedance as measured from drain to source.

RF Test Fixture



PARTS LIST

| | |
|-----------|---|
| C1,C6,C10 | CAPACITOR 1000pF |
| C7 | CAPACITOR 10pF |
| C2,C5 | CAPACITOR 10pF |
| C3 | CAPACITOR 30pF |
| C4 | CAPACITOR 25pF |
| C8 | CAPACITOR 500pF |
| C9 | FEEDTHROUGH CAPACITOR 500pF |
| C11 | MONOLITHIC CERAMIC CAPACITOR 0.1uF |
| C12 | ELECTROLYTIC CAPACITOR 50uF 50 VOLTS |
| L1 | 0.25" X 0.63" HAIRPIN, NO. 22 AWG |
| L2 | 0.25" X 0.20" MICROSTRIP LINE |
| L3 | 0.25" X 0.40" MICROSTRIP LINE |
| L4 | 0.30" X 0.06" HAIRPIN, NO. 18 AWG |
| L5 | 6 TURNS OF NO. 20 AWG ON "0.30". CLOSE WOUND |
| L6 | 12 TURNS OF NO. 20 AWG ON "0.30". CLOSE WOUND |
| R1 | RESISTOR 12K OHMS 0.25 WATT |
| Q1 | UF2820R |
| BOARD | FR4 0.062" |